

**REMARKS**

Upon entry of the claim amendments Claims 1-3, 5-19, 22-24, and 30-37 will be all the claims pending in the application.

Applicants have incorporated subject matter from Claim 4 into Claim 1.

The amendments to independent Claims 30 and 31 are supported by the description at, for example, paragraph [22] bridging pages 9 and 10 of the specification.

New Claims 32-37 are supported by the description at, for example, paragraphs [02], [03], and [07] of the specification.

Claims 4, 20-21, and 25-29 are canceled without prejudice or disclaimer. Applicants reserve the right to file a continuation application(s) directed to subject matter of the canceled claims.

No new matter is added.

**I. RESPONSE TO REJECTION UNDER 35 U.S.C. § 112**

Referring to pages 2 and 3 of the Office Action, Claims 1-15, 20-21, and 25-31 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.

Applicants respectfully traverse. The subject matter of the currently pending claims satisfies the requirements of the second paragraph of §112.

With respect to Claim 1, the term “energy densities of the order of the working energy densities of optical systems for microlithography” is clear and definite to, and consequently would be understood by, one of ordinary skill in the art. As evidence, Applicants submit herewith for the examiner’s consideration the article J. MARTIN ALGOTS, ET AL., “Compaction and Rarefaction of Fused Silica with 193-nm Excimer Laser Exposure,” Optical Microlithography XVI, Anthony Yen, Editor, Proceedings of SPIE, 2003, pp. 1639-50, Vol. 5040. The submitted article mentions that typical energy densities to which quartz glass is exposed in microlithography applications range from 0.04 mJ/cm<sup>2</sup> to 0.1 mJ/cm<sup>2</sup>. See Figures 10-14 and the penultimate sentence of the article’s Abstract.

Also with respect to Claim 1, Applicants have amended the recitation of “the peroxy defect level in the quartz glass material” to “a peroxy defect level in the quartz glass material,” thereby eliminating any perceived issue of lack of antecedent basis.

Reconsideration and withdrawal of the present §112 rejection with respect to Claim 1 is requested.

With respect to Claim 4, Applicants have incorporated the subject matter thereof into Claim 1. Further, the relevant recitation in amended Claim 1 states “an ozone concentration,” rather than the original “the ozone concentration, thereby eliminating any perceived issue of lack of antecedent basis.

With respect to the examiner's query as to what is intended by maintaining an “environment in a production flame,” it is noted that Claim 1 is understood by one of ordinary skill in the art to recite that the temperature in a production flame, the gas composition in the production flame, and the environment in the production flame are selected so that an ozone concentration in the flame is minimized.

Reconsideration and withdrawal of the present §112 rejection with respect to Claim 4 is requested.

With respect to Claim 11, Applicants have amended the recitation of “the energy density” to “the energy densities,” thereby directly referencing the recitation of “energy densities” in Claim 1 and eliminating any perceived issue of lack of antecedent basis.

Also, amended Claim 11 states that “the local hydrogen concentration profile is matched to a local distribution of the energy densities when the quartz glass material is in use for microlithography.” Therefore, it no longer varies in accord among different end use applications.

Reconsideration and withdrawal of the present §112 rejection with respect to Claim 11, and indeed all of the presently rejected pending claims, is requested.

**II. RESPONSE TO REJECTION UNDER 35 U.S.C. § 102**

Referring to pages 3 and 4 of the Office Action, Claims 1-3, 8-15, 20-21, and 28-31 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,086,352 ("Yamagata").

Applicants respectfully traverse. The subject matter of the presently rejected claims is not anticipated by the disclosure of Yamagata.

With respect to Claim 1, Applicants have incorporated subject matter from Claim 4 into Claim 1. Claim 4 was not included in the present §102 anticipation rejection. Therefore, withdrawal of the present §102 rejection as it applies to Claim 1 and its dependents is requested.

With respect to Claims 30 and 31, each at least recites that at least one halogen is introduced into the quartz glass material either during a deposition process or during a subsequent heat treatment.

Yamagata may disclose quartz glass containing chlorine. However, the chlorine content in Yamagata is explained by the fact that one of the starting substances for producing quartz glass,  $\text{SiCl}_4$ , already contains chlorine atoms. See column 25, lines 24-30, of Yamagata.

Yamagata does not disclose or suggest introducing at least one halogen into a quartz glass material either during a deposition process or during a subsequent heat treatment.

For the foregoing reasons, Applicants request reconsideration and withdrawal of the present §102 anticipation rejection.

**III. RESPONSE TO REJECTION UNDER 35 U.S.C. §§ 102/103**

Referring to pages 4 and 5 of the Office Action, Claims 20 and 21 are rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Yamagata.

Without acknowledging any possible merit to the present §102/§103 rejection, Claims 20 and 21 have been canceled, thereby rendering moot the rejection. Its withdrawal is requested.

**IV. RESPONSE TO REJECTION UNDER 35 U.S.C. § 103**

Referring to pages 6 and 7 of the Office Action, Claims 4-6 and 25-26 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamagata in view of U.S. Patent Application Publication No. 2002/0194869 ("Borrelli").

Applicants respectfully traverse. The subject matter of the presently rejected claims is not taught or suggested by the applied combination of art.

Applicants have incorporated subject matter from Claim 4 into Claim 1. Therefore, Claim 1 recites that the temperature, gas composition and environment in a production flame are selected so that an ozone concentration in the flame is minimized. The combination of Yamagata in view of Borrelli does not teach or suggest to minimize the concentration of ozone in the flame during quartz production.

In this regard, the examiner's silence with respect to Yamagata is taken as an acknowledgement that the examiner agrees with Applicants that Yamagata does not teach or suggest to minimize the concentration of ozone in the flame during quartz production.

As for Borrelli, it states at paragraph [0011] on page 1 "that the 260 nm absorption is related to the molecular oxygen content of the glass." Accordingly, Borrelli may teach one of ordinary skill in the art at paragraphs [0010] and [0011] on page 1 to reduce the concentration of molecular oxygen (O<sub>2</sub>) from the production process. Borrelli, however, does not teach or suggest to minimize the concentration of ozone in the flame during quartz production. Further, Borrelli does not teach or suggest a problem solved by the present application, *i.e.*, that a high ozone concentration in the flame leads to peroxy defects.

For the foregoing reasons, Applicants request reconsideration and withdrawal of the present §103 obviousness rejection.

**V. RESPONSE TO REJECTION UNDER 35 U.S.C. § 103**

Referring to page 7 of the Office Action, Claims 7 and 27 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamagata in view of Borrelli and in further view of U.S. Patent No. 6,375,905 ("Moini").

Applicants respectfully traverse. The subject matter of the presently rejected claims is not taught or suggested by the applied combination of art.

Claim 7 depends from Claim 1, and Claim 27 has been canceled without acknowledging any possible merit to the present §103 rejection. For the reasons stated at Section IV above, the combination of Yamagata in view of Borrelli does not teach or suggest to minimize the concentration of ozone in the flame during quartz production. Moini fails to cure the identified deficiency of Yamagata in view of Borrelli.

For the foregoing reasons, Applicants request reconsideration and withdrawal of the present §103 obviousness rejection.

## VI. CONCLUSION

Reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the examiner feels may be best resolved through a personal or telephone interview, the examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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**23373**

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